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him for a time, but he had not been there long before his bodily weakness increased, and during the last few weeks he very gradually and peacefully faded away. The end came rather suddenly. He died at Grantown, on 1892 October 24, in the seventy-ninth year of his age.

Professor Grant was elected a Fellow of the Royal Astronomical Society on 1850 June 14, and was a member of the Council from 1853 to 1860. E. D.

John Hartnup was born at Somerset House, in the apartments of the Society, in 1841, when his father held the position of Assistant Secretary. In 1843 his father removed to Liverpool, having been appointed Astronomer to the Mersey Docks and Harbour Board, and the whole of Mr. Hartnup's life may be said to have been passed upon the banks of the Mersey. He was educated at the Royal Institution School, Liverpool, and at a private academy at Chester, and his scientific training seems to have been effected under his father's sole and careful supervision. He became assistant in the Liverpool Observatory, in 1863, shortly before the Observatory was removed from the Waterloo Dock to its present position at Bidston, and there he gave unremitting attention to those many experiments on chronometrical rates with which his father's name has been so long connected, and which have proved of such signal service to the mercantile marine.

When his father retired from the service of the Mersey Docks and Harbour Board, Mr. Hartnup succeeded him as director of the Observatory, and so remained until his death. His most valuable contributions to science have been his papers on chronometrical management, and his reputation must rest on these. He gave effective support and assistance to the Liverpool Astronomical Society, holding for some time the position of vice-president, and other scientific societies in Liverpool found in him a warm and cordial supporter. He was elected a Fellow of the Royal Astronomical Society on 1886 February 12.

On 1892 April 21 he was killed by falling from the roof of the Observatory, where he had mounted to make some meteorological observations. W. E. P.

Thomas Archer Hirst was born at Heckmondwike (Yorkshire) on 1830 April 22, and was educated at the West Riding Proprietary School, Halifax. The acquaintance he there made with John Tyndall had a great influence on his future life. Tyndall went to Marburg University in 1847, and a visit paid to him there was sufficient to determine Hirst to migrate to that University, to study mathematics, physics, and chemistry. He graduated in 1852, presenting a dissertation on "Conjugate Diameters of the Ellipsoid." From Marburg he went to Göttingen, where he made the acquaintance of Gauss and worked at magnetism under Weber; and thence to Berlin. He was

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recalled to England to succeed Tyndall at the Queenwood College, Hampshire, and remained there for three years; and in 1854 he married Anna, youngest daughter of Samuel Martin, Esq., of Loughorne, County Down, Ireland; but the delicate health of his wife necessitated a visit to the South of France during the winter of 1856-7, which was unfortunately unavailing, for Mrs. Hirst died on the return journey in Paris. Dr. Hirst then spent two years abroad, attending the lectures of eminent mathematicians (Chasles, Liouville, Lamé, Bertrand), and writing several memoirs. Early in 1860 he unexpectedly found employment in University College School, of which he was made head master on the death of Mr. Cook. It was during his five years' tenure of this appointment that he made experiments on teaching geometry apart from "Euclid"; and he was one of the founders (in 1871) of the Association for the Improvement of Geometrical Teaching, and its president for the first seven years. In 1865 Dr. Hirst was appointed Professor of Mathematical Physics in University College, London, and in 1867 Professor of Mathematics, in succession to De Morgan. In 1870 he accepted the newly-created appointment of Assistant Registrar in the University of London, in consequence of which he resigned not only his professorship, but his general secretaryship of the British Association, which he had held for four years. Early in 1873, when the Royal Naval College was founded at Greenwich, Dr. Hirst was appointed Director of Studies, which position he occupied until 1883, when ill-health compelled him to resign it, and pass much of his time abroad. He died on 1892 February 16.

Dr. Hirst was one of the original members of the London Mathematical Society (1861); was on its council 1864–1883; was treasurer for several years, and president 1872–1874. He was elected a Fellow of the Royal Astronomical Society in 1866, but never contributed any papers to the Society. He was elected Fellow of the Royal Society in 1861, was three times a member of its council, and twice one of its vice-presidents; and in 1883 he was awarded a Royal Medal. He was also a member of several other learned societies, British and foreign. His scientific work was chiefly confined to pure mathematics, and the excellence of its quality will be gathered from the uniform success which marked his career. Among his more important papers are those "On Equally Attracting Bodies" (*Phil. Trans.* 1857–8); "On Ripples and their Relation to the Velocity of Currents" (*Phil. Mag.*, 1861); "On the Volumes of Pedal Surfaces" (*Phil. Trans.*, 1863); "On the Quadric Inversion of Plane Curves" (*Proc. R.S.*, 1865); and many in the *Proceedings of the Mathematical Society*, 1869–90.

Joseph Kleiber, second son of Henry Kleiber, was born at St. Petersburg on 1863 December 15. He graduated at St. Petersburg University, and while privat-docent delivered lectures on "The Application of Mathematics to Social Phenomena," and

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